Prof. G. Zachmann
A. Srinivas

University of Bremen
School of Computer Science
CGVR Group
November 5, 2014

Winter Semester 2014/15

Assignment on Virtual Reality and Physically-Based Simulation - Sheet 2

Due Date 18. 11. 2014

Exercise 1 (Scenegraph, *5 Credits*)

a) Figure 1 shows a very simple human model. Figure 2 shows the individual "parts" of the human model. The model was created only from sphere primitives , which have been scaled and transformed. Draw a scene graph at least to a depth of 3 (consider the sphere primitives as well) that represents such a model. The scenegraph should also contain nodes such that the model can be animated in canonical way, i.e., arms and legs can be rotaed about their respective joints etc. *Hint*: consider each sphere primitive of the model while constructing the scenegraph.

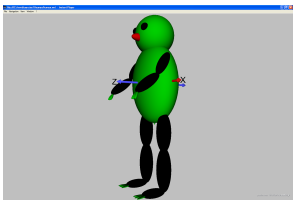
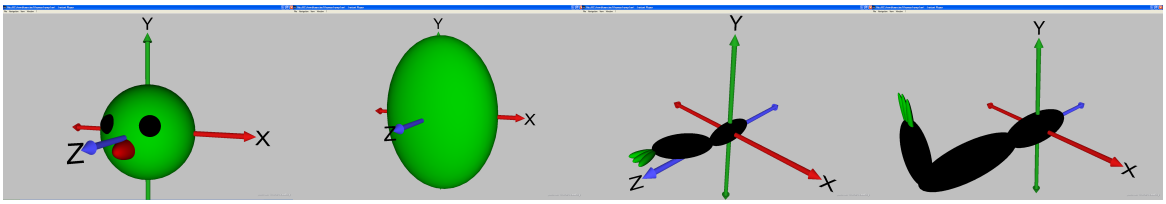


Figure 1: Model



(a) Head (b) Body (c) Arm (d) Leg

Figure 2: Sub-groups

Exercise 2 (Introduction to X3D, *3 Credits*)

Model a simple Fir tree and also integrate other **X3D** models into this tree as shown in Figure 3.

Your task in detail:

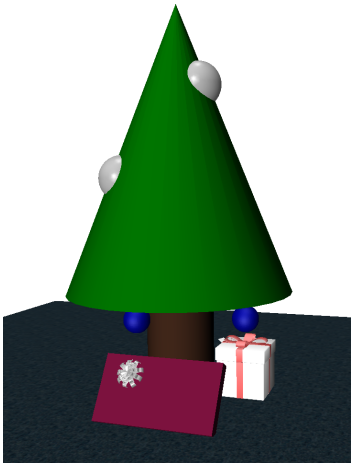


Figure 3: Christmas Tree

1. Create a simple Christmas tree out of cylinder and cone geometry nodes in X3D file "**XMasTree.x3d**" with an ASCII editor (If you want, you can decorate this tree with some spheres).
2. Include the **X3D** models "**GiftBox2.x3d**", "**GiftBox3.x3d**" and "**kugel.x3d**" (these files are available on the lecture website in frameworks column in "**ChristmasTreeFramework.zip**") into the above Christmas tree scene. Scale and position the integrated models as shown in Figure 3. *Hint* : use the <Inline url="'filename"'> to include **X3D** files.

Exercise 3 (X3D-Animation, *7 Credits*)

Animation of objects make virtual world seem more real.

Your task is to:

a) Download the framework "**PorscheFramework.zip**" and integrate all parts of the car (i.e. wheel "**porscheWheel.x3d**" and the chassis "**porscheChassis.x3d**" models) to form a complete model of the car as shown in Figure 4. Implement this integration within the main file "**porscheComp.x3d**", which defines the scene.

b) Implement a basic animation where all fours wheels of the car rotate continuously using time sensors, interpolators and routes.

Figure 4: Porsche car complete model